

E. R. GILL.
 SELECTIVE SIGNALING DEVICE.
 APPLICATION FILED SEPT. 4, 1908.

1,004,566.

Patented Oct. 3, 1911.

2 SHEETS—SHEET 1.

Fig. 2

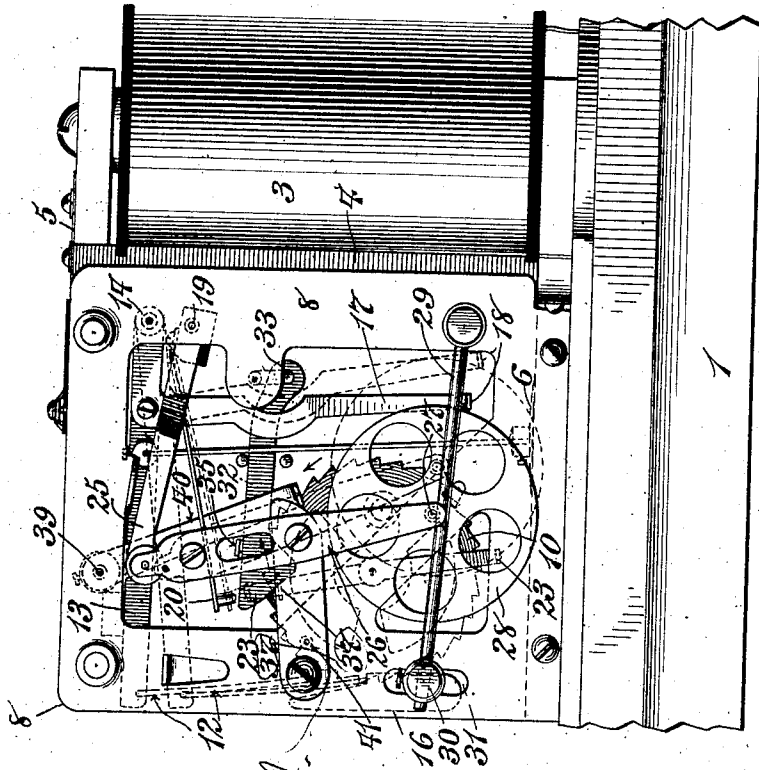
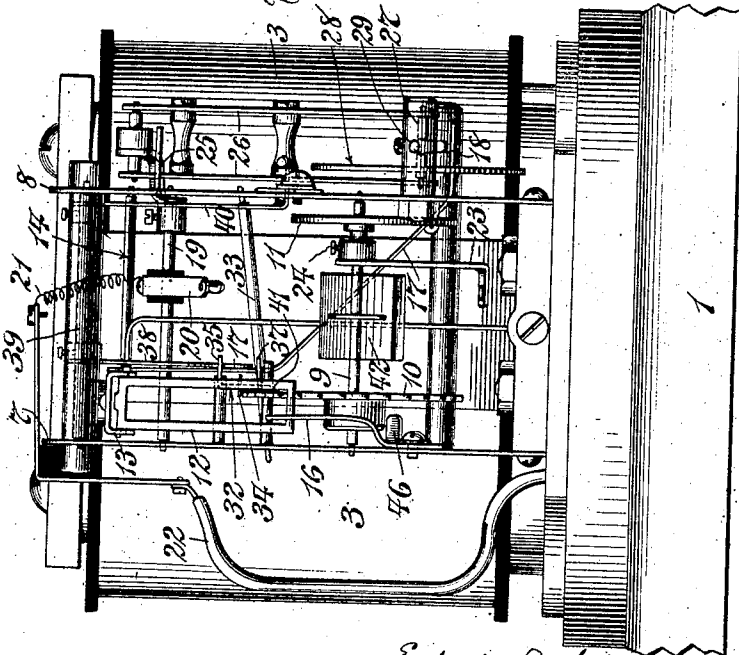


Fig. 1



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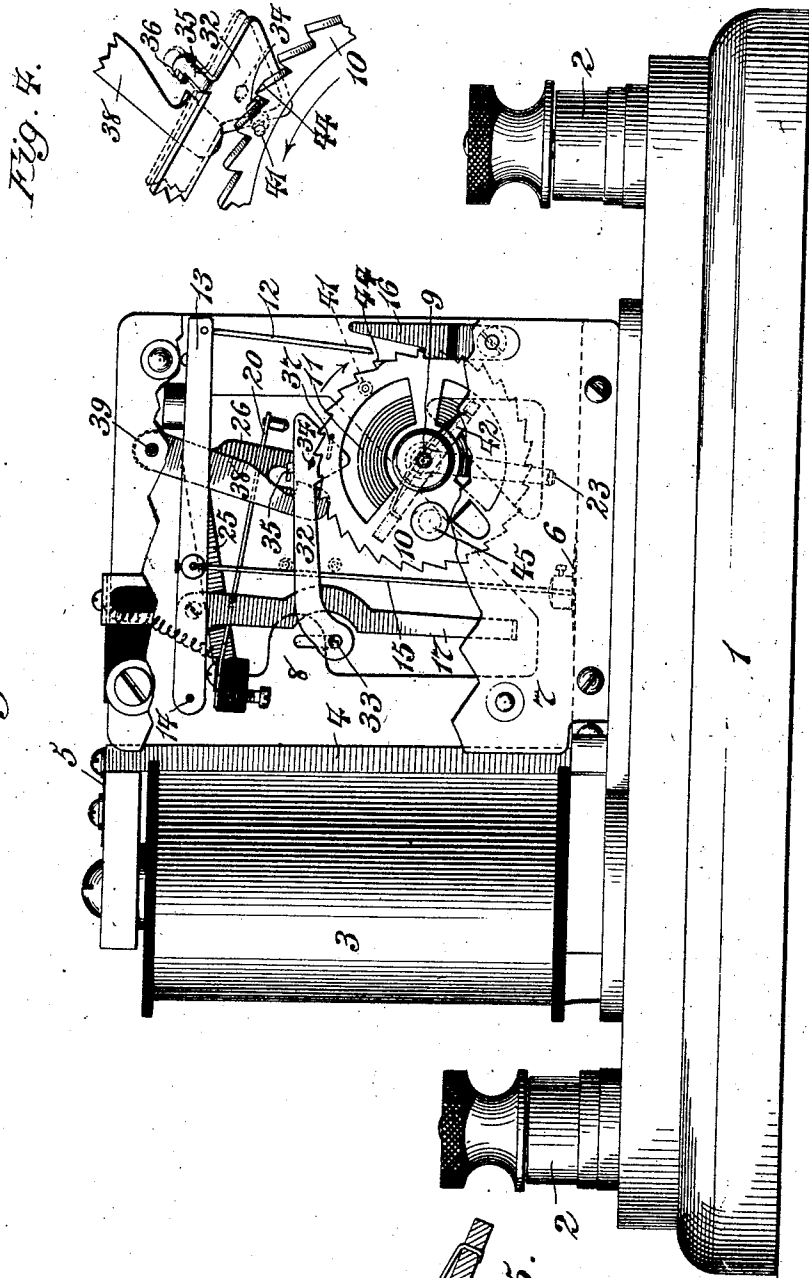


Fig. 3.

Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE.

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SELECTIVE SIGNALING DEVICE.

1,004,566.

Specification of Letters Patent.

Patented Oct. 3, 1911.

Application filed September 4, 1908. Serial No. 451,662.

To all whom it may concern:

Be it known that I, EDWIN R. GILL, a citizen of the United States, residing in the city of Yonkers, county of Westchester, and State of New York, have invented a certain new and useful Improvement in Selective Signaling Devices, of which the following is a specification.

My present invention has relation to an improvement in that class of electro-magnetic selecting devices, whereby any one of a number of telegraph or telephone stations may be signaled at will without disturbing other stations on the same line. My improved selector can also be applied to signaling or calling in other connections.

One advantage of the present invention is that it makes it possible to call any one of a group of stations with the minimum loss of time and with complete certainty.

Another advantage of this invention is that it makes it possible to manufacture all instruments alike and to prepare any given instrument for operation by any desired combination within its scope, by the simplest possible means, easily and rapidly adjusted by anyone.

My present invention comprises certain other improvements and advantages some of which are applicable to a large class of selective instruments for the purposes named, which advantages are set forth hereinafter.

My present invention is shown in a preferred illustrative form in the accompanying drawings wherein—

Figure 1 is a front view of my selector with the cover removed, Fig. 2 is a side elevation thereof, looking from the right in Fig. 1, Fig. 3 is a similar view looking from the left in Fig. 1, and showing a part of the supporting framework broken away, Fig. 4 is a perspective of a detail, and Fig. 5 is a sectional view of the preferred form of frictional rebound preventer.

The base 1 carries the entire selector to which current is brought by appropriate binding posts, as, for instance those shown at 2. The selector is directly actuated by the magnet 3, whose armature 4 hangs from a spring 5 and whose lower and movable end is attached to a bowed spring 6 which is straightened whenever the lower end of the armature is attracted toward the magnet poles.

The mechanism thus far described is similar to that disclosed in my Patent No. 906,523 issued to me December 15, 1908 and therefore requires no further description.

The supporting sides 7 and 8 of the framework carry a transverse shaft 9 upon which is mounted a fixed toothed wheel 10 at one end and, at the other end, a spiral spring 11, whereby the shaft and wheel are returned to the normal position shown when the wheel 10 is released. Forward movement of the wheel is produced by descent of the thin flat bail 12, pivoted at the extremity of the lever 13 which is fixed at its opposite end to the oscillatory shaft 14. The lever 13 and the pawl or bail 12 are normally maintained in their raised positions shown by the rod 15 whose lower end is supported upon the bowed spring 6, so that, when said spring is straightened by action of the magnet 3, the rod 15, and with it the lever 13, is depressed. Under these circumstances, the pawl 12 engages one of the teeth of said wheel and impels the same forward through the distance of one tooth. This movement of the pawl 12 is limited by the inclined stop plate 16.

The lever 13 carries an arm 17 extending downward and then across the instrument to a point 18 outside of the supporting plate 8, as shown in Fig. 1. The function of this arm is to control the automatic movements of the retarded circuit controller which latter will next be described.

A pivoted shaft 19 extends across between the plates 7 and 8, and upon this shaft is carried the circuit controlling lever 20, preferably separated from the shaft by insulation, as shown, and to which are connected wires 21, 22 through which the signaling current passes. When the signal circuit is closed, the tip of the lever 20 touches the top of the lever 23, which is carried by the shaft 9 and may be adjusted thereon by means of the set screw 24. It is by this adjustment that any given instrument may be arranged for operation by any desired combination within its scope. The shaft 19 also carries an approximately horizontal arm 25, which extends outside of the plate 8, and to the end of which are pivoted the flat side bars 26. Between these side bars, at their lower ends there turns freely a short polished steel shaft 27 carrying an inertia disk 28; and rolling

normally upon a polished steel wire track 29 whose inclination is preferably made adjustable by fixing its outer support 30 at different points in the slot 31. It will be seen that, unless supported, the wheel 28 will roll
 5 down the track 29 causing the shaft 19 to turn so as to depress the outer end of the lever 20, and, if this movement is sufficiently prolonged, the tip of the lever 20 will be
 10 made to touch the tip of the lever 23, supposing this latter to have been brought into proper position. (This is shown in dotted lines in Fig. 2.) Normally, however, this movement of the disk 28 down the track 29
 15 is prevented by the extension 18 of the arm 17, attached to the main impelling lever 13.

In order to bring the arm 23 into the proper position for control of the proper signal circuit, it is necessary to revolve the shaft 9 exactly the proper distance, and this distance will, of course, depend upon the initial position of the lever 23 which is adjusted for each instrument by the set screw 24. The forward revolution of the shaft 9
 20 is accomplished by successive downward movements of the pawl 12, produced by corresponding successive actions of the magnet 3, and in order to prevent return of the wheel 10 and shaft 9 between successive actions of the driving pawl 12, I provide a retaining pawl 32 carried by an inclined shaft 33 having extended journals (see Fig. 1) which permit said shaft and pawl to move together in a direction transverse to the
 25 plane of the wheel 10. A catch 34 extends from the outer face of the pawl 32 into the plane of the wheel 10, and from the opposite side of the pawl there extends a projection 35 preferably cut away to form a terminal shoulder 36. (See Fig. 4.) When the wheel 10 is turned back to the normal position shown by action of the spring 11, an inclined wire 37 on the inner face of said wheel impinges upon the inclined under
 30 edge of the pawl 32 so as to lift it into the uppermost of three possible positions and to thrust it outward, or to the left in Fig. 1, in which position the catch 34 is ready to fall into engagement with the teeth of the
 35 wheel. The position thus produced is that shown in Figs. 1 to 3. When the descent of the driving pawl 12 moves the wheel 10 forward one tooth, the pawl 32 moves downward slightly until the shoulder 36 is caught
 40 by the gravity hook 38. In this position the catch 34 is ready to engage with the upper part of a tooth on the wheel 10, and thus hold it stationary during the upward movements of the driving pawl 12. The
 45 hook 38 is fixed to an easily revoluble shaft 39, which also carries an arm 40 whose lower end projects sidewise into the path of movement of one of the side bars 26 which carry the disk 28. It will thus be seen, that if the
 50 disk 28 is allowed to roll far enough in any

given instance, the side bar 26 will act through the arm 40 and shaft 39 to push the hook into the position shown in Fig. 4, and so release the pawl 32, allowing the catch 34 to fall upon the wheel 10 into a position
 70 wherein it will engage with the lower portion of each tooth of said wheel as it moves into engaging positions.

It will be noted that the tooth immediately under the catch 38 when the wheel 10 is in normal position is cut away at the top (see Fig. 3). This is to prevent operation of the wheel 10 during periods of use of any telegraphic apparatus which may be used in connection with the device, and also
 80 to facilitate bringing all the wheels of a group back to normal by an indefinite number of quick pulsations. It is found very convenient in many cases to connect my selector in circuit with telegraphic instru-
 85 ments in such a manner that the selective signal can be sent over the same wire that is used in telegraphing. In such a case, while the line is idle the parts will remain as shown in Figs. 1 to 3, but while the line
 90 is in use for telegraphic purposes, the quick alternations of energization and deenergization of the magnet 3 will produce a relatively rapid up and down movement of the pawl 12 which would act to drive the wheel
 95 10 forward all the time. This effect is normally prevented by the fact that the catch 34 is supported by the hook 38 in such a position that it cannot engage with the cut down tooth below it. In consequence of this, the
 100 wheel 10 merely vibrates back and forth under the alternate influence of the pawl 12 and the spring 11. When, however, it is desired to utilize the selector for producing a signal, the controlling circuit is so managed
 105 as to preserve circuit in the coils of the electro-magnet 3 for a relatively long period of time. The pawl 12 is thus held down, and with it the arm 17 is held away from the disk 28, so long that said disk has time
 110 to roll down the track 29 until the side bar 26 strikes the arm 40 and pushes the hook 38 away from the shoulder 36 on the pawl 32. This permits the catch to fall behind the first low tooth, so that, when next the pawl
 115 12 rises, the return of the wheel 10 under the influence of the spring 11 is prevented. The wheel 10 is then in its starting position and, as the subsequent teeth are all high enough to strike the catch 34 whether supported
 120 by the hook 38 or not, each subsequent downward movement of the pawl 12 will have a permanent forward effect upon the wheel 10.

It will be understood that, each time the pawl 12 and lever 13 rise rapidly after a forward movement of the wheel 10, the arm 17 pushes the disk 28 quickly back up the track 29, while the shaft 27 slides upon the track. During a succession of rapidly re-
 125 130

curing movements of the pawl, there will therefore take place a corresponding succession of slow rolling movements of the disk 28 for a very short distance down the track 29, interrupted, before the arm 40 is reached, by quick sliding movements back to normal, caused by pushes of the arm 17. It will thus be seen that, during such a succession of quick movements the pawl 32 will always be supported by the hook 38, and the circuit controlling lever 20 will never have time to descend far enough to intercept the path of movement of the lever 23 on the shaft 9.

The operation whereby a signal is sent to a selected station exclusively is as follows—supposing the group of stations upon a single line wire to be twenty-four or less, then one of my instruments is placed at each station and the levers 23 on the different shafts 9 are separately adjusted to twenty-four different positions. Instrument number one will be arranged so that a movement of the wheel 10 by one tooth beyond the starting position will bring its lever 23 directly under the tip of the lever 20. Instrument number two will be arranged to reach this position after two forward impulses of the wheel, and so on with the other twenty-two in succession. All of the instruments will be arranged in a well known manner, so that their magnets 3 are all energized simultaneously by any make and break upon the common line wire. Supposing now that station number six is to be exclusively signaled to. The calling operator having brought all the instruments together to the normal position shown, will first hold the circuit through all the magnets 3 closed long enough to permit the catch 34 to engage the cut off starting tooth. He will then produce six energizations of all the magnets in quick succession, but will sustain the last long enough to give the lever 20 time to descend. These six impulses will have brought the lever 23 at station number six directly under the lever 20, while the lever 23 in all the other instruments of the group will either have moved too far or not far enough. Consequently, although the levers 20 in all the grouped instruments will descend simultaneously during the last pause, only that at station number six will drop upon its corresponding lever 23. A local circuit will thus be controlled at station number six only, which may be utilized to produce a temporary or a permanent local signal in any well known manner.

It is one advantage of my improvement that it can be used to call any or all of the stations of a group in rapid succession by one operation of the wheel 10. It is only necessary to produce, say twenty-four energizations of all the magnets in succession, pausing at the proper intervals corresponding to the stations wanted, whereby local signals

will be produced in such stations as are called for, in rapid succession and without disturbing any others.

In order to make sure that all the wheels start together from normal, it is only necessary to send over the line a large number of rapid impulses whereby all the wheels are brought to their final position. The conditions existing in this position are shown in Fig. 4, wherein the arrow shows the direction of rotation of the wheel 10 in returning to normal. In telegraphic circuits the ordinary impulses used for sending messages will produce the desired effect.

The wheel 10 carries a pin 41 which comes in contact with the pawl 32 when the final position of the wheel is reached and pushes said pawl slightly away from its engaging position. The last tooth on the wheel is beveled as shown at 44 in Fig. 4, so that, when the spring 11 tends to drive the wheel 10 backward, this beveled surface strikes the catch 34 and completes the lateral movement of the pawl whereby the wheel 10 is freed; after which, of course, the wheel returns to normal, bringing the inclined wire 37 against the edge of the pawl and restoring it to operative position as heretofore described. While I have shown and described both the pin 41 and the beveled tooth 44 for freeing the wheel, it is to be understood that either of these agencies might be used alone for this purpose without departing from my invention. The dotted lines in Fig. 4 show the position of the pawl 32 when pushed out of engagement with the wheel.

It will be understood that my device will ordinarily be operative without cutting away the pawl projection 35, to form the shoulder 36, but I prefer this construction as thereby the pawl is freed from both the wheel 10 and the hook 38, when it moves laterally as described, and thus accidental interference by the hook 38 is securely avoided.

Where a wheel, such as 10, returns rapidly to normal under the influence of a spring, such as 11, there will be a tendency to rebound, which might result in the pawl catching one of the operative teeth in one or more of the instruments of a group. In order to avoid this entirely, I provide the device shown on a large scale in Fig. 5. As shown, a weight is frictionally attached to the shaft 9 so as to be carried by and tend to turn with it at all times. This weight is arranged to produce a certain rotative inertia and for this purpose I may use a metal plate 42 extending symmetrically across the shaft 9 and attached thereto by the wire 43 which presses the plate up close against said shaft so as to produce a proper amount of friction. The angular position of the plate 42 upon the shaft 9 is immaterial, and indeed this position will change constantly during ordi-

nary operation of the device. When the wheel 10 is rapidly turned back to normal, however, the plate 42 turns with it, and, when the wheel is arrested by the stop 45 striking the projection 46, the inertia plate 42 keeps on turning for an appreciable interval of time, dragging the wire 43 around the shaft 9, and producing a continued tendency to hold the wire 37 against the pawl 32. This will serve to prevent all danger of rebound.

The instrument herein described may be used in any number of grouped stations within the limits of a practical size for the wheel 10 and a practical number of teeth thereon, and it will be seen that operation of my improved device does not involve the use of any elements required to be kept in synchronism with each other, thus eliminating a source of much uncertainty and permitting a combination of simplicity of structure with perfect reliability.

Certain details above described are capable of use in selectors differing in their general plan of operation from that herein shown, and I have claimed the same broadly, so as to cover their use in any appropriate selector.

Various changes may be made in this device without departing from the scope of my invention and I am not to be understood as limiting myself to the details herein shown and described.

What I claim is—

1. A selective signaling device comprising a toothed wheel, a circuit controlling element moved thereby and an impelling pawl for said wheel, in combination with an oscillatory shaft, a second circuit controlling element thereon, an arm on said shaft, side bars pivoted on said arm, an inertia wheel mounted between said side bars, an inclined track whereon said wheel is adapted to roll,

and means operating simultaneously with the impelling means for the toothed wheel for controlling the movements of said inertia wheel, substantially as described. 45

2. A selective signaling device comprising a toothed wheel, impelling means therefor, means for returning the wheel to normal when released, a retaining pawl mounted so as to be capable of movement transverse to the plane of the toothed wheel, means for causing said pawl to move away from said wheel, a hook, and a projection on said pawl having a wide shoulder near its tip for engaging with said hook and so placed as to avoid engagement with said hook when the pawl is moved away from the toothed wheel, substantially as described. 50

3. A selective signaling device comprising a toothed wheel, impelling means therefor, means for returning the same to normal when released and a weight frictionally connected with said wheel so as to turn therewith, substantially as described. 55

4. A selective signaling device comprising a toothed wheel, impelling means therefor, means for returning the same to normal when released and a weight mounted upon the wheel axle and frictionally attached thereto so as to turn with it, substantially as described. 60

5. A selective signaling device comprising a toothed wheel, impelling means therefor, means for returning the same to normal when released, a weight extending across the shaft of said wheel and a wire fixed to said weight and passing over said shaft so as to create a frictional connection between the shaft and weight, substantially as described. 65

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Witnesses:

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